Climate Change and Human Health Literature Portal

![National Institute of Environmental Health Sciences]

Toward unsupervised outbreak detection through visual perception of new patterns

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Abstract:

BACKGROUND: Statistical algorithms are routinely used to detect outbreaks of well-defined syndromes, such as influenza-like illness. These methods cannot be applied to the detection of emerging diseases for which no preexisting information is available.This paper presents a method aimed at facilitating the detection of outbreaks, when there is no a priori knowledge of the clinical presentation of cases. METHODS: The method uses a visual representation of the symptoms and diseases coded during a patient consultation according to the International Classification of Primary Care 2nd version (ICPC-2). The surveillance data are transformed into color-coded cells, ranging from white to red, reflecting the increasing frequency of observed signs. They are placed in a graphic reference frame mimicking body anatomy. Simple visual observation of color-change patterns over time, concerning a single code or a combination of codes, enables detection in the setting of interest. RESULTS: The method is demonstrated through retrospective analyses of two data sets: description of the patients referred to the hospital by their general practitioners (GPs) participating in the French Sentinel Network and description of patients directly consulting at a hospital emergency department (HED).Informative image color-change alert patterns emerged in both cases: the health consequences of the August 2003 heat wave were visualized with GPs' data (but passed unnoticed with conventional surveillance systems), and the flu epidemics, which are routinely detected by standard statistical techniques, were recognized visually with HED data. CONCLUSION: Using human visual pattern-recognition capacities to detect the onset of unexpected health events implies a convenient image representation of epidemiological surveillance and well-trained "epidemiology watchers". Once these two conditions are met, one could imagine that the epidemiology watchers could signal epidemiological alerts, based on "image walls" presenting the local, regional and/or national surveillance patterns, with specialized field epidemiologists assigned to validate the signals detected.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2706246

Resource Description

Communication: ⊠

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

 A focus of content

Communication Audience: ⊠

audience to whom the resource is directed

Health Professional, Researcher

Early Warning System: ☒

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☒

weather or climate related pathway by which climate change affects health

Temperature, Unspecified Exposure

Temperature: Extreme Heat

Geographic Feature: ☒

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☒

resource focuses on specific location

Global or Unspecified

Health Impact: ☒

specification of health effect or disease related to climate change exposure

General Health Impact, Infectious Disease, Injury

Infectious Disease: Airborne Disease

Airborne Disease: Influenza

Intervention: ☒

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Medical Community Engagement: ☒

resource focus on how the medical community discusses or acts to address health impacts of climate change

A focus of content

Mitigation/Adaptation: ☒

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: ☒

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content